

## **RESPONSE**

The present Amendment is presented in response to the Examiner's Office Action mailed May 13, 2002.

Reconsideration of this application is respectfully requested in view of the foregoing amendments to the claims and the following remarks. For the convenience and reference of the Examiner, Applicant's remarks are presented in the order in which the corresponding issues were raised by the Examiner in the Office Action.

In connection with the matters contemplated herein, Applicant respectfully notes that the following discussion should not be construed to constitute an exhaustive enumeration of the distinctions between the claims of the present application and the references cited by the Examiner. Instead, such distinctions are presented solely by way of example. Consistent with the foregoing, the discussion herein is not intended, and should not be construed, to prejudice or foreclose future consideration, by the Applicant, of additional or alternative distinctions between the claims of the present application and the references cited by the Examiner.

**A. Rejection of Claim 9 under 35 USC § 112, second paragraph**

The Examiner has rejected claim 8 under 35 U.S.C. § 112, second paragraph, stating that "Claim 9 recites the limitation 'nickel' as a third component when only two components are claimed in claim 1." In this regard, the Examiner has alleged that "there is an insufficient antecedent basis for this limitation in the claim."

Applicant respectfully submits that in view of the clarifying amendment to claim 9 submitted herewith, the rejection of the Examiner has been overcome and should be withdrawn.

**B. Rejection of Claims 1-18 under 35 USC § 103(a)**

Applicant respectfully notes at the outset that in order to establish a *prima facie* case of obviousness, it is the burden of the Examiner to demonstrate that three criteria are met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See* M.P.E.P. § 2143.

The Examiner has rejected claims 1-18 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,104,532 issued to Weiss (the “’532 Patent”). Applicant disagrees with the contentions of the Examiner, but submits that for at least the reasons outlined below, the rejection of the Examiner has been overcome and should be withdrawn.

Specifically, Applicant notes that independent claims 1 and 13, as herein amended, are directed to structures formed of, among other things, at least one “powder metal component.” Applicant submits however, that the ‘532 Patent fails to teach or suggest, at least, this limitation of claims 1 and 13. Thus, even if the ‘532 Patent is modified as suggested by the Examiner, the resulting combinations nonetheless fail to teach or suggest all of the limitations of independent claims 1 and 13.

For at least this reason, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to independent claims 1 and 13, as well as with respect to their corresponding dependent claims 2-12 and 14-18, respectively. Applicant thus respectfully submits that the rejection of the Examiner has been overcome and should be withdrawn.



### CONCLUSION

In view of the remarks submitted herein, Applicant respectfully submits that each of the pending claims 1-18 and 25-40 are now in condition for allowance. Therefore, reconsideration of the rejections is requested and allowance of those claims is respectfully solicited. In the event that the Examiner finds any remaining impediment to a prompt allowance of this application that could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this 13<sup>th</sup> day of September, 2002.

Respectfully submitted,

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Version With Markings to Show Changes

Claims 1, 2, 4, 6-10, 12, 13 and 18 have been amended as follows:

1. (Once Amended) An x-ray tube component comprising:  
a first [metallic] **powder metal** component comprised of a material that is substantially non-transmissive to x-radiation; a second [metallic melt] **powder metal** component, mixed with the first [metallic] **powder metal** component in a manner so as to form a predetermined component shape; and wherein the mixture of the first [metallic] **powder metal** component with the second [metallic melt] **powder metal** component together limits the amount of x-radiation that is able to pass through the x-ray tube component to a predetermined level.
2. (Once Amended) An x-ray tube as defined in claim 1, wherein the first [metallic] **powder metal** component material includes tungsten.
4. (Once Amended) An x-ray tube as defined in claim 1 wherein the second [metallic melt] **powder metal** component includes copper.
6. (Once Amended) An x-ray tube as defined in claim 1, wherein the first [metallic] **powder metal** component comprises tungsten and the second [metallic] **powder metal** component comprises copper.

7. (Once Amended) An x-ray tube as defined in claim 6, wherein the x-ray tube component comprises:

approximately 80% by weight tungsten as first [metallic] **powder metal** component; and  
approximately 20% by weight copper as the second [metallic] **powder metal** component.

8. (Once Amended) An x-ray tube as defined in claim 1, wherein the second [metallic] **powder metal** component includes at least one of the following: nickel, iron, cobalt, and aluminum.

9. (Once Amended) An x-ray tube as defined in claim 1, wherein the x-ray tube component comprises:

90% by weight tungsten as the first [metallic] **powder metal** component;  
[8% by weight nickel and]  
2% by weight iron as the second [metallic] **powder metal** component[.]; **and**  
**8% by weight nickel as a third powder metal component.**

10. (Once Amended) An x-ray tube component as defined in claim 1, wherein the first [metallic] **powder metal** component includes at least one of the following: tungsten, copper, molybdenum, tantalum, steel, bismuth, lead, and alloys of the foregoing.

12. (Once Amended) An x-ray tube component as recited in claim 11 wherein the housing further comprises [an adhesion] **a bond** layer that is disposed on the exterior surface of said x-ray tube housing, wherein the [adhesion] **bond** layer enhances the bond strength between said x-ray tube housing and a connected structure.

13. (Once Amended) An x-ray generating apparatus comprising:

an integral housing forming a vacuum enclosure, at least a portion of the integral housing is formed of a mixture of [metallic] **powder metal** components that together limit the amount of x-radiation that is able to pass through the portion of the integral housing to a predetermined level;

an anode assembly having a rotating anode with a target portion, the rotating anode being disposed within the vacuum enclosure; and

a cathode assembly, disposed within the vacuum enclosure, having an electron source capable of emitting electrons that strike the target portion to generate x-rays which are released through a window formed through a side of the integral housing.

18. (Once Amended) An x-ray generating apparatus as defined in claim [14] **13**, wherein the **mixture of** [metallic] **powder metal** components comprise a first [metallic] **powder metal** material that is substantially non-transmissive to x-radiation, and a second [metallic] **powder metal** material, mixed with the first [metallic] **powder metal** material, so as to form the integral housing portion.

Claims 25-40 have been added as follows:

25. (New) The x-ray generating apparatus as defined in claim 13, wherein the mixture of powder metal components includes first and second powder metal components, the first powder metal component taking the form of a supporting matrix for the second powder metal component.

26. (New) The x-ray generating apparatus as defined in claim 13, wherein the mixture of powder metal components includes at least one powder metal component selected from the group consisting of: copper; nickel; iron; cobalt; and aluminum.

27. (New) The x-ray generating apparatus as defined in claim 13, wherein the mixture of powder metal components includes at least one powder metal component selected from the group consisting of: tungsten; copper; molybdenum; tantalum; steel; bismuth; lead; and alloys of each of the foregoing.

28. (New) The x-ray generating apparatus as defined in claim 13, wherein the mixture of powder metal components includes first and second powder metal components, the first powder metal component comprising a melt component and the second powder metal component comprising a radiation shield component.



29. (New) An x-ray tube component having a predetermined shape with at least one surface and comprising:

a first powder metal component; and

a second powder metal component mixed together with the first powder metal component to form the x-ray tube component in the predetermined shape, the second powder metal component comprising a material that is substantially non-transmissive with respect to x-radiation.

30. (New) The x-ray tube component as recited in claim 29, wherein the first powder metal component takes the form of a supporting matrix for the second powder metal component.

31. (New) The x-ray tube component as recited in claim 29, wherein the first powder metal component comprises at least one material selected from the group consisting of: copper; nickel; iron; cobalt; and aluminum.

32. (New) The x-ray tube component as recited in claim 29, wherein the second powder metal component comprises at least one material selected from the group consisting of: tungsten; copper; molybdenum; tantalum; steel; bismuth; lead; and alloys of each of the foregoing.

33. (New) The x-ray tube component as recited in claim 29, further comprising a third powder metal component mixed together with the first and second powder metal components.

34. (New) The x-ray tube component as recited in claim 33, wherein the third powder metal component substantially comprises chromium.

35. (New) The x-ray tube component as recited in claim 29, further comprising an oxidized layer disposed on at least a portion of the at least one surface of the x-ray tube component.

36. (New) The x-ray tube component as recited in claim 29, further comprising a bond layer disposed on at least a portion of the at least one surface of the x-ray tube component.

37. (New) The x-ray tube component as recited in claim 29, wherein the second powder metal component is in an amount that is in the range of about fifty percent to about ninety nine percent, by weight, of the x-ray tube component.

38. (New) The x-ray tube component as recited in claim 29, wherein the x-ray tube component comprises at least a portion of a billet.

**39. (New) The x-ray tube component as recited in claim 29, further comprising a third powder metal component mixed together with the first and second powder metal components, the first, second and third powder metal components collectively comprising heavy metal alloy.**

**40. (New) The x-ray tube component as recited in claim 29, wherein the second powder metal component comprises a tungsten-aluminum alloy.**

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